CSP in China

June 28, 2012
For the Internal Workshop in Tunis
Solar Energy Distribution in China (40 km Solar Concentrators (kWh/m²/day))
Before China’s solar energy is mostly focused on Solar PV and Solar Water Heater

By end of 2011, Solar PV installation 2.14 GW

By end of 2010, Soar water heater installation 168 million m²
Solar Resources for CSP

• Lack of resource assessment (micro-siting)
• For those area with good resources
  – High altitude: low efficiency of power gen
  – Sandy and windy weather: damage the receiver and making the framework shaking or deformation
Development Status

• Demonstration stage

• 863 program of MOST (Ministry of Science and Technology): CSP is an advanced energy technology which needs support. 1 MW demonstration project was built in Beijing.

• High temperature solar heating demonstration system: 19 projects were built.

• CSP: under construction and under preparation
Projects Under Construction and Preparation

• Project approved with fixed tariff: 50MW concessional project

• Other projects under construction and preparation. 9 projects: 400 MW

• In total: 450MW
Projects List

1. Datang, 50 MW, Erdos, Trough with 3 hours storage
2. China Power Investment (CPI), 100MW, Gemol, Qinghai, Tower
3. Tianwei/Datang, 1.5 MW, Jiayuguan, Gansu Trough
4. Huaneng, 1.5MW, Sanya, Hainan, Fresnel
5. Zhejiang Zhongkong, 50MW, Delingha, Qinghai, Tower
6. Huadian, 50MW, Jinta, Gansu, Trough, no storage
7. China Guangdong Nuclear, 50MW, Delingha, Qinghai, Trough
8. Yikebo, 1MW, Sanya, Hainan, Tower
9. Huaneng, 50MW, Lasa, Tibet
10. China Guangdong Nuclear, 100MW, Wuwei, Gansu Trough
ADB (Asian Development Bank) financed CSP

• In 2009, ADB decided to support Huadian (one of the big five power gen companies) to develop a CSP project
  – Selected several sites in Gansu and Qinghai, and completed preliminary FSR

• November 2011, ADB started to discuss with NEA (national energy administration) on feasibility to develop CSP in China.
  – Under design
  – Resource assessment, analysis on development potential and future
  – Select demonstration project and start feasibility study
Technology Direction

• Trough
• Tower
• Fresnel

• Complement to other energy source, e.g. with conventional coal fired power plant
Development Objective

Envisaged by NEA in its draft development plan

• 1000 MW in 2015

• 3000 MW in 2020
CSP Concessional Project-WB Financed

- January 2011, Datang New Energy Won the bid for building 50 MW CSP in Inner Mongolia
  - 5 hours storage
  - Tariff 0.9399 Yuan/kWh (around US$ 0.16/kWh with tax)
  - Construction duration: 30 months
  - life time: 25 years
  - Annual output: 120 GWh
  - Total investment: RMB 1.0 billion (about US$ 160 million)
  - Air cooling
Snap short of the Project in Inner Mongolia Financed by the WB
Image of the Project Site
Still Under Debate

• Con:
  – High cost, wait until break through in technology to cut down the cost
  – No industry, equipment need to be imported
  – No technology support
  – Not enough resource and place fit for CSP

• Pro:
  – Stable output, basic load
  – Operation experience is important, learning by doing. Otherwise, no progress can be made.
Thanks!

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